

## Remarks

In the present response, two claims (1 and 16) are amended. Claims 1-23 and 50 are presented for examination.

### **I. Claim Rejections: 35 USC § 102(b)**

Claims 1 are rejected under 35 USC § 102(b) as being anticipated by USPN 5,432,873 (Hosoya). Applicants respectfully traverse this rejection.

A proper rejection of a claim under 35 U.S.C. §102 requires that a single prior art reference disclose each element of the claim. See MPEP § 2131, also, *W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 U.S.P.Q. 303, 313 (Fed. Cir. 1983). Since Hosoya neither teaches nor suggests each element in claims 1 and 50, these claims are allowable over Hosoya.

As one example, claim 1 recites that the channel is created “within a planar layer in a first substrate of a multi-layered printed circuit board (PCB) and within a planar layer in a second substrate of the multi-layered PCB.” Hosoya discloses that the optical waveguides are formed on top of a substrate, not within the substrates of a multi-layered printed circuit board. Figures 1 and 2 of Hosoya show a substrate 6 that has two waveguides 8 and 11 formed on top of the substrate 6. Again, nowhere does Hosoya state that the waveguides are formed in substrate 6. Further, nowhere does Hosoya state that the waveguides are formed in substrates of a multi-layered printed circuit board.

For at least these reasons, claims 1 and 50 are allowable over Hosoya.

As another example, claim 1 recites that the first and second substrates are stacked together in a multi-layered printed circuit board. Hosoya does not teach two substrates that are stacked with a channel formed in both the first and second substrates of a multi-layered PCB. Figs. 1 and 2 in Hosoya show a single substrate 6 with a first waveguide 8 formed in thin layer 7 and a second waveguide 11 formed in thin layer 10. Again, Hosoya does not disclose two stacked together to form a multi-layered PCB as recited in claim 1.

For at least these reasons, claims 1 and 50 are allowable over Hosoya.

As another example, claim 50 recites “switching the switch between an opaque state that prevents passage of an optical signal and a transparent state that permits passage

of the optical signal.” Nowhere does Hosoya teach that a switch is switched between opaque and transparent states as claimed. The Office Action cites column 7, lines 1-25 in Hosoya. This section of Hosoya discusses introducing light of different wavelengths and power into the waveguides. Hosoya never states that switching occurs between opaque and transparent states as claimed.

Anticipation under section 102 can be found only if a single reference shows exactly what is claimed (see *Titanium Metals Corp. v. Banner*, 778 F.2d 775, 227 U.S.P.Q. 773 (Fed. Cir. 1985)). For at least these additional reasons, claim 50 is allowable over Hosoya.

## **II. Claim Rejections: 35 USC § 103(a)**

Claims 2, 4-5, and 9-11 are rejected under 35 USC § 103(a) as being unpatentable over Hosoya in view of US publication number 2003/0118310 (Steinberg). As shown above in section I, Hosoya does not teach or suggest all the elements in independent claim 1. For at least these reasons, dependent claims 2, 4-5, and 9-11 are allowable over Hosoya in view of Steinberg.

## **III. Claim Rejections: 35 USC § 103(a)**

Claims 2-5 and 12-15 are rejected under 35 USC § 103(a) as being unpatentable over Hosoya in view of USPN 6,624,077 (White). As shown above in section I, Hosoya does not teach or suggest all the elements in independent claim 1. For at least these reasons, dependent claims 2-5 and 12-15 are allowable over Hosoya in view of White.

## **IV. Claim Rejections: 35 USC § 103(a)**

Claims 2, 6-9, and 14 are rejected under 35 USC § 103(a) as being unpatentable over Hosoya in view of US publication number 2001/0026670 (Takizawa). As shown above in section I, Hosoya does not teach or suggest all the elements in independent claim 1. For at least these reasons, dependent claims 2, 6-9, and 14 are allowable over Hosoya in view of Takizawa.

**V. Claim Rejections: 35 USC § 103(a)**

Claims 16, 18-19, and 21-22 are rejected under 35 USC § 103(a) as being unpatentable over USPN 6,624,077 (White) in view of USPN 6,693,736 (Yoshimura). These rejections are traversed.

Claim 16 recites providing first and second substrates in respective first and second layers. Each layer has a channeled face defining a channel formed in the substrate. The layers are placed together to form a channel in a multi-layered printed circuit board. By contrast, White does not disclose first and second substrates with channels formed in the substrates of a multi-layered printed circuit board. As shown in Fig. 2A of White, the channel 210 is formed in the cladding layers 206/207, not in the substrate 204. A cladding layer is not a layer of a multi-layered printed circuit board.

For at least these reasons, claim 16 and its dependent claims are allowable over White in view of Yoshimura.

As yet another example, claim 16 recites vias through first and second layers of the multi-layered printed circuit board. The vias connect a channel “with different optical pathways extending through different vertically stacked layers of the multi-layered printed circuit board.” Nowhere does White in view of Yoshimura teach or even suggest such a recitation.

For at least these reasons, claim 16 and its dependent claims are allowable over White in view of Yoshimura.

### **CONCLUSION**

In view of the above, Applicants believe that all pending claims are in condition for allowance. Allowance of these claims is respectfully requested.

Any inquiry regarding this Amendment and Response should be directed to Philip S. Lyren at Telephone No. 832-236-5529. In addition, all correspondence should continue to be directed to the following address:

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Respectfully submitted,

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